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Data Survey and Sampling Procedures to Quantify Recreation Use of National Forests in Alaska

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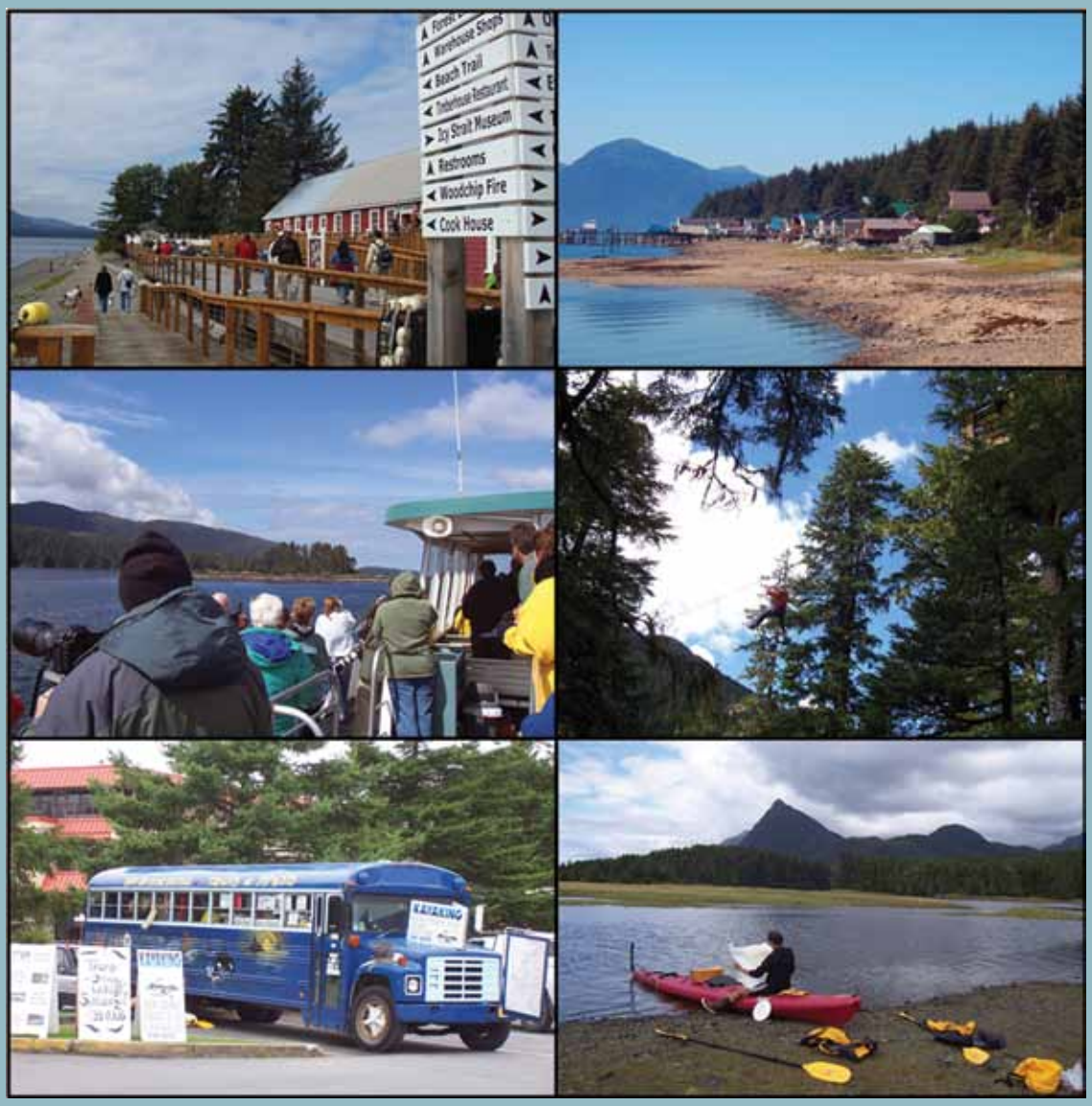

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Abstract

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Estimating visitor numbers and collecting information on visitor attitudes in Alaska national forests is especially challenging because of the dispersed access to the forests by a relatively small number of visitors. The Tongass and Chugach National Forests are each millions of acres with miles of saltwater coastline and numerous lakes that allow almost infinite boat and float plane access points. This study identified a number of methods used by land managers in Alaska and other states to address dispersed recreational access as well as other ongoing data collection processes in Alaska, such as sport fish angler surveys, traveler surveys, and other systematic efforts that generate visitor data. These data may be useful for USDA Forest Service efforts to improve their visitor use monitoring processes.

Keywords: Visitor use monitoring, national forest visitation, Alaska public lands, Alaska visitation, Alaska visitor surveys, Alaska wilderness use.

Contents

Introduction

The purpose of this study is to document findings regarding available data and sampling procedures that may be used to better quantify recreation use on Alaska's Chugach and Tongass National Forests, which together make up the U.S. Department of Agriculture Forest Service (USDA FS) Region 10–the Alaska Region (fig. 1). Recreation resources and activities in the region are dispersed over large areas with low average use per acre with almost infinite entry points via saltwater boat and airplane access. In addition, resident and nonresident and local and nonlocal use patterns are quite different. Nonresidents often access the forests with guides or permit holders. In contrasts, residents, especially local residents, make frequent visits to the forests for recreation, hunting, fishing, and subsistence activities. This is especially true in the 17-million-acre Tongass National Forest that surrounds most communities in southeast Alaska. This combination of characteristics makes quantifying recreation use challenging.

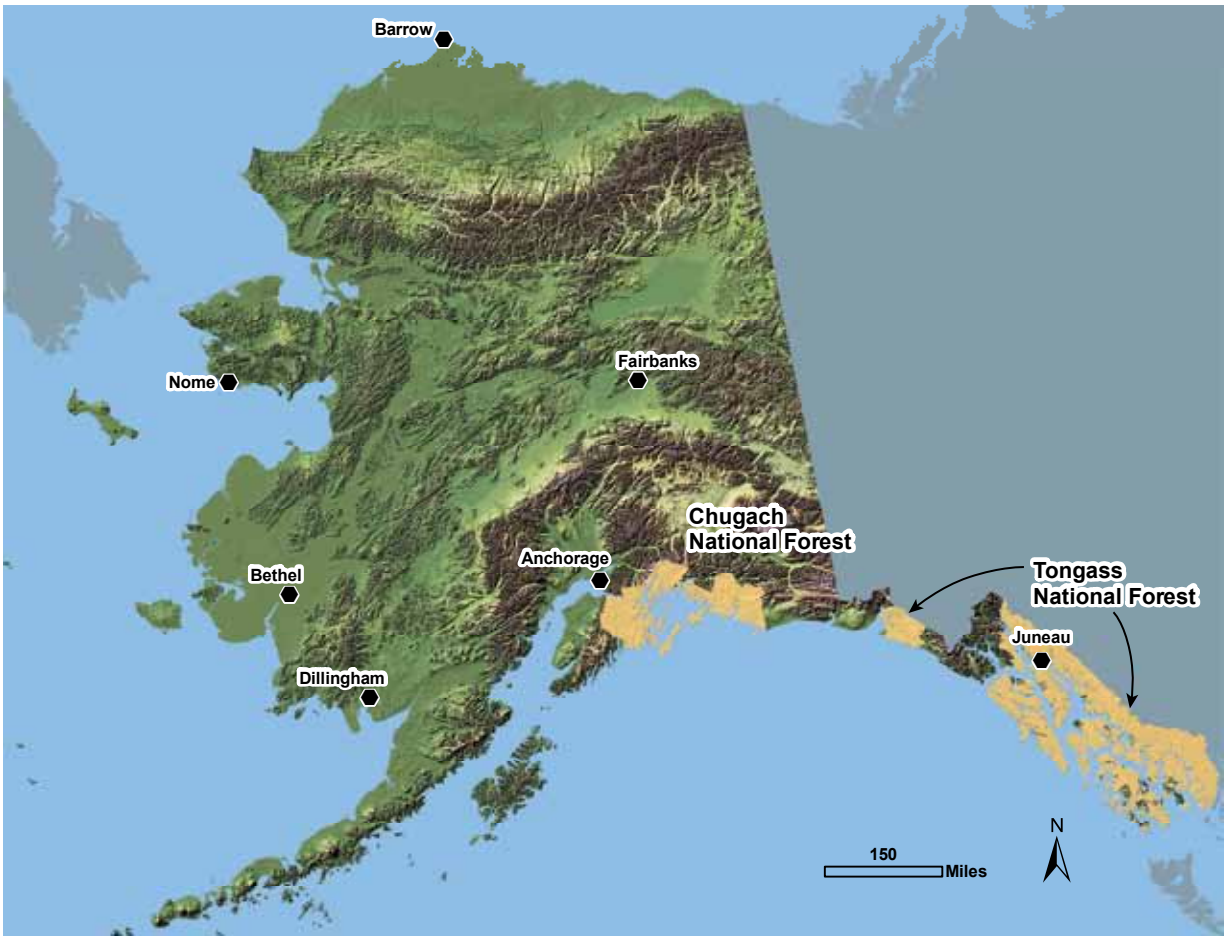

Figure 1—Locations of Chugach and Tongass National Forests in USDA Forest Service Alaska Region (Region 10).

The USDA FS implemented the National Visitor Use Monitoring (NVUM) Program across the entire National Forest System (NFS) in calendar year 2000. The primary objective of the NVUM program is to develop reliable estimates of recreation use on NFS lands via a nationally consistent, statistically valid sampling approach. Secondary objectives of NVUM are to characterize recreation visits, collect data in support of regional economic analyses, and gauge national forest visitor satisfaction (White and Wilson 2008). The information presented here is intended to assist in the development of adjustments to the NVUM system or development of additional data collection procedures. These adjustments and new procedures may improve the ability of managers to measure recreational visitor use on national forests in Region 10.

The first section of this study identifies data currently available from other ongoing Alaska visitor data collection processes. Specific efforts are included based on their potential for improving the USDA FS visitor use monitoring processes in Alaska. This is followed by information on visitor use estimation processes currently being used by land management agencies in Alaska and recent innovative techniques outside Alaska. The final sections discuss potentially available data and recommend future research efforts.

Data Currently Available

This section presents information on applicability of data currently being collected for Region 10 national forest visitor use estimation. It also includes information on the potential for adjusting the data or collection methods to improve applicability to USDA FS use. Information provided in this report is intended to complement rather than duplicate the sources documented in a previous report (Colt et al. 2002).

Surveys

Alaska Visitor Statistics Program—

The Alaska Visitor Statistics Program (AVSP) is a comprehensive series of statewide, full-year, surveys of Alaska nonresident visitors. The first four rounds of research were completed in 1984, 1987, 1993, and 2001. Each round consisted of a random arrival survey, a visitor expenditure survey, and a visitor opinion survey. Data from the arrival surveys were used to model total visitation and to estimate the number of visitors arriving by various transportation modes in the intervening years between studies (table 1 and fig. 2).

The most recent research—AVSP V, the fifth cycle of the program—was conducted in 2006/2007. Primarily because of changes in travel security measures after September 11, 2001, the field survey procedures were changed in 2006. Hence,

Table 1—Nonresident visitor counts from the Alaska Visitors Statistics Program

Year	Total Alaska visitors	Domestic air	International air[a]	Cruise ship arrivals[b]	Cruise ship passengers[b]	Ferry	Highway
1985	671,673	416,422	15,100	148,349		29,136	62,666
1986	752,775	443,302	19,335	161,300		33,348	79,190
1987	742,100	433,000	20,800	171,600		36,500	63,600
1988	752,400	428,500	24,400	168,700		37,600	76,300
1989	807,121	474,441	27,333	155,514		33,673	93,212
1990	886,891	512,728	26,453	194,728		35,278	93,827
1991	898,190	548,643	27,232	198,100		34,754	66,519
1992	977,173	578,600	20,200	212,800	265,000	32,100	107,849
1993	1,052,785	610,700	18,100	246,967	306,000	33,200	116,715
1994	1,134,800	660,100	18,700	285,100	379,000	31,800	118,700
1995	1,175,200	685,900	19,200	283,500	383,000	30,600	119,400
1996	1,294,800	750,800	27,700	338,000	464,484	27,200	113,500
1997	1,330,200	742,300	25,400	392,200	524,842	21,400	112,700
1998	1,380,000	741,200	25,300	431,400	569,707	24,700	123,000
1999	1,434,200	777,400	26,700	457,300	595,959	23,200	121,100
2000	1,455,400	803,300	23,500	483,750	640,477	20,600	107,550
2001	1,453,475	805,300	19,100	510,000	690,600	18,800	100,500
2002	1,528,800	810,900	20,500	581,000	739,800	18,400	96,800
2003	1,567,200	803,700	28,200	620,900	777,000	17,600	94,300
2004	1,693,900	869,700		712,400	884,400	17,800	94,000
2005	1,875,200	1,018,500		761,100	953,400	13,600	82,000
2006	1,881,000	1,012,600	20,900	758,100	958,900	13,300	76,100
2007	1,961,500	1,047,200		827,800	1,029,800	12,100	74,400

[a] International air is combined with domestic air for 2004 and 2005.

[b] Cruise ship arrivals are people who arrive in Alaska via cruise ship. Cruise ship passengers are visitors who are cruise passengers but enter or exit Alaska by another mode, usually air. The passenger numbers are not additive but provide more details on visitor markets.

AVSP V consists of two main components: the visitor volume estimates and the visitor survey.

The visitor volume component includes estimates of the number of out-of-state visitors exiting Alaska, by transportation mode, during the study period. The estimates are made in two steps. In step 1, the total number of people exiting the state is determined from airline and U.S. Department of Transportation sources. In step 2, the ratio of nonresidents to residents is estimated from a sample and applied to this total.[1] If one assumes that travel patterns are not changing, the AVSP visitor volume estimates can be used to estimate trends over time in nonresident visitor activity, including activity on national forest lands. The volume estimates also provide a useful "reality check" against which other modeling results and estimates can be compared.

[1] For more detail on visitor volume methodology, see http://www.commerce.state.ak.us/oed/toubus/pub/7Methodology.pdf.

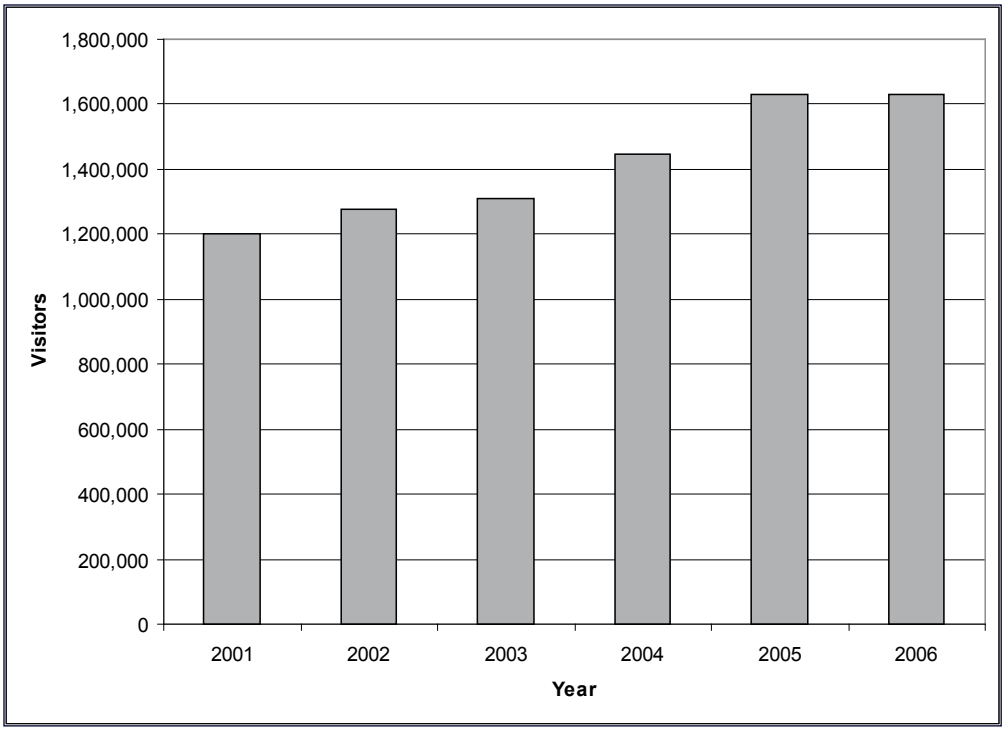

Figure 2— Alaska Visitor Statistics Program summer visitor volume estimates, 2001-2006. Adapted from Alaska Department of Commerce, Community, and Economic Development 2007.

The AVSP visitor survey is administered to a sample of out-of-state visitors departing Alaska at all major exit points. The survey includes questions on trip purpose, transportation modes used, length of stay, destinations, lodging, activities, expenditures, satisfaction, trip planning, and demographics. The AVSP visitor survey provides reliable information on Alaska tourism activity both statewide and for more highly visited urban areas. It is less useful for estimating visitor numbers to remote or rural areas because of both the sampling methodology and the focus of the survey questions. The current sampling methodology results in a small sample size for visitors to rural and remote areas because the total number of visitors to those areas is small relative to the total number of visitors to Alaska (approximately 2 million people during summer 2007). For an adequate sample of nonresident visitors to rural and remote areas, an over sample is required. This was done for the 2001 AVSP IV but has not been done before or since.

The 2006 visitor survey asked for the number of nights spent and the type of lodging used for visits to 27 specific communities (see app. 1 for questions 9 and 9a on the AVSP survey instrument). The survey also provided spaces for write-in locations (see Alaska Department of Commerce, Community, and Economic Development 2007 for AVSP survey regions). The AVSP Technical Appendix

provides information on other locations noted by visitors; none of these locations were national forests (McDowell Group 2008).

The survey also asked visitors to indicate the type of lodging in which they stayed each night of their visit. Lodging types included "state/national campgrounds" and "wilderness camping." However, the data as currently collected are not specific enough to tie visitation to specific conservation units, including national forests. During summer 2006, 3 percent of visitors reported spending at least one night in a state or national campground. Based on the summer market size of 1.6 million, there were nearly 49,000 state/federal campground users. In addition, the manner in which the day use visitation question is structured virtually eliminates the ability of respondents to indicate a day visit to a national forest.

It may be possible for the land management agencies to work with the Alaska Department of Commerce, Community and Economic Development to refine questions for future rounds of the AVSP. However, the survey instrument was shortened considerably for AVSP V to address declining response rates. Indeed, extra public lands and rural community questions had been added to the AVSP IV survey, but these were thought by some to have exacerbated the problem of declining response rates.

Despite the limitations at the local level for visitor numbers, tracking Alaska visitor numbers via the AVSP data provides a background on overall trends in the Alaska tourism industry and the potential "pool" of available visitors to the Tongass and Chugach National Forests. The AVSP could theoretically provide additional information but this will only occur with significant cooperative efforts by state of Alaska, federal agency, and industry partners.

Alaska Resident Statistics Program—

The Alaska Resident Statistics Program (ARSP) is a collaboration among several federal and Alaska state agencies and the University of Alaska Fairbanks. Federal agencies participating in ARSP are the USDA FS, National Park Service, Bureau of Land Management, and the U.S. Fish and Wildlife Service. State agencies participating are the Alaska Department of Transportation and the Alaska Department of Fish and Game. The ARSP is intended to identify recreation data that address management information needs among federal and state agencies in Alaska and to develop and administer a survey to gather these data. The program is relatively new, with the first survey administered in fall 2006 through spring 2007 after a 5-year planning effort. The ARSP is intended to be an ongoing effort, with a core set of questions remaining constant over time and additional questions regarding specific issues asked on a rotating basis. The goals are to decrease redundancy in data-gathering efforts and develop a shared database that can be used to monitor future recreation trends in Alaska.

The 2006/2007 survey gathered data on travel patterns, participation in outdoor recreation activities, and broad measures of benefits received from recreation on public lands in Alaska. For this phase, a mail survey was developed that divided the state into five regions and, within each region, four smaller subregions. Respondents were asked about travel to those regions, frequency of participation in outdoor recreation in the subregions, and "displaced sites." Displaced sites are visits to recreation areas that the respondent wanted to make but did not owing to perceived crowding or other perceived negative factors, or personal reasons that may not be associated with the site (e.g., a move, illness, etc.). Displaced visits include both those that are shifted from one time to another and those that are avoided altogether. A goal of survey design was to increase the specificity of information and obtain information that is difficult to gather onsite.

As of December 2008, the initial analysis and final project report was being completed, and thus these resulting data from the first survey have not been made available to researchers outside of the project. Hence, it is not currently possible to determine their applicability for estimating resident use of national forests in Alaska.

Alaska Travelers Survey—

The Alaska Travelers Survey is a proprietary research program and database created by the McDowell Group, a private consulting firm.[2] The survey sample includes visitors exiting the state via all major travel modes: air, ferry, highway, and cruise ship. The program is repeated every other year. The Alaska Travelers Survey was created specifically for tourism marketing and planning. The sample selection and field execution is designed to capture large samples of visitors to individual communities and regions. Additionally, data can also be collected for a wide array of subsamples and niche markets such as sport fishermen, wildlife watchers, highway travelers, adventure travelers, rental vehicle users, and independent visitors. Because fieldwork and data processing costs are shared among multiple subscribers, the Alaska Travelers Survey allows clients to obtain market research in a more efficient and affordable manner.

Since the program was developed in 2001, an estimated 18,000 personal intercept surveys have been conducted with Alaska visitors. This extensive database provides an opportunity to detect trends in visitor volume, satisfaction ratings, destinations visited, visitors' activities and spending, demographics, and other market characteristics.

[2] The use of trade or firm names in this publication is for reader information and does not imply endorsement by the U.S. Department of Agriculture of any product or service.

McDowell Group surveyed visitors using all major transportation modes in 2001, 2003, and 2005. In 2008, the firm conducted a limited survey effort, allowing subscribers an opportunity to detect market changes since the last statewide Alaska Travelers Survey and the publicly funded AVSP V project in 2006.

There are several ways in which the USDA FS could participate:

- Become a subscriber and negotiate a contract with McDowell Group for prior year data and analysis. Each contract is negotiated separately.
- Become a subscriber and contract directly with McDowell Group to conduct a stand-alone intercept survey.
- Subscribers can contract for specialized analysis as part of a statewide field survey. There may be cost savings from shared survey costs and the ability to insert questions into the statewide survey (or targeted samples).
- The cost of any of these options is contingent on sample size, data acquisition costs, and level of detail in the analysis. The sampling can also be modified to fit the needs of specific clients. One aspect that would need to be modified is the current focus exclusively on nonresident visitors.[3]

Specific data on resident and nonresident travel to the Prince William Sound region are lacking. It may be that the communities of Chenega, Cordova, Tatitlek, Valdez, Whittier, or their convention and visitor bureaus would be interested in a cooperative traveler survey project to develop better information. The National Wildlife Federation Alaska Office also has an ongoing tourism economic indicator project in Prince William Sound and is interested in improved visitor information. See appendix 2 for respective contacts.

Sport Fish Division angler survey—

The Alaska Department of Fish and Game, Sport Fish Division tracks sportfishing participation and harvests throughout Alaska. Data identify resident and nonresident anglers based on the fishing license of the participant. The data are collected via an annual mail survey of sportfishing license holders. The information includes the number of anglers, trips, and days fished, as well as harvests, in saltwater and freshwater areas in regions and subregions throughout Alaska. These data are believed by some to be useful for subregional trend analysis, but the sample size is likely too small for estimating visitor numbers for individual watersheds. The Tongass National Forest is located within the Division of Sport Fish Region I: Southeast Alaska, which is further divided into eight subregions. The Chugach National Forest is located in Region II: South-Cental Alaska, which contains 10 subregions.

[3] Bell, Susan, 2008. Personal communication. Principal, McDowell Group, 1400 West Benson Blvd., Suite 350, Anchorage, AK 99503.

Sport Fish Division economic survey—
The purpose of this project, initiated in 2007, is to provide reasonably precise and up-to-date information on the economic importance of angler spending by both residents and nonresidents to the Alaska economy at the statewide, regional, and key subregion levels. It is an economic significance study that will estimate the total expenditures associated with sportfishing in Alaska in 2007, as well as the total direct, indirect, and induced economic effects of angler spending in terms of total jobs, total wages and salaries, and tax receipts.

One of the key objectives of the project is to establish a consistent and repeatable methodology for collecting and reporting estimates of the economic significance of sportfishing in Alaska periodically (3 to 5 years) at the statewide, regional, and subregional levels. When the same methodology is used for multiple data collection cycles, the resulting estimates can be used for tracking and comparing activity over time, as well as making reasonably current estimates available to planning and regulatory decisionmakers (Alaska Sport Fish Division, n.d.). The initial round of data collection occurred from July 2007 to February 2008. Information from this study could potentially be used in combination with sport fish survey data to estimate the economic significance of sport fishing on freshwater streams on the Chugach and Tongass National Forests. See appendix 2 for contact information.

Division of Wildlife Conservation hunter reports—
The Alaska Department of Fish and Game, Division of Wildlife Conservation annually collects data on hunter characteristics and hunting effort. There are three primary methods, but the objectives and data collected from each effort are similar. The three methods are hunter report cards, deer hunter surveys, and furbearer seal reports.[4] The fields collected by all methods that may be of use to USDA FS visitor estimates include:

- Hunter residence
- Targeted species
- Specific hunts and their dates
- Days in the field
- Transportation mode used to access hunt areas
- Location of hunts
- Whether the hunt was successful.

[4] Kamletz, Kurt, 2008. Personal communication. Information Management Team Leader, Division of Wildlife Conservation, Alaska Department of Fish and Game, P.O. Box 110020, Douglas, AK 99811-0020.

The most widespread method is the hunter report card, which all hunters are required to return to the Division of Wildlife Conservation regardless of whether they hunted. All of the hunter information is stored in a database.

For Sitka black-tailed deer (*Odocoileus hemionus sitkensis*) in southeast Alaska, an annual deer hunter harvest mail survey is conducted to estimate the harvest and hunter effort. The survey is mailed to a sample of hunters who obtained deer harvest tickets in Region I (southeast Alaska) during the deer hunting season. By definition, anyone who obtained a harvest ticket was successful in their hunt—they went hunting and harvested at least one deer.

In recent years, the survey asked hunters to be specific in describing the locations (islands, bays, shore, or drainages) where they hunted deer. Approximately 33 percent of the deer hunters hunting in southeast Alaska who obtained deer harvest tickets are sent surveys. Hunters are randomly selected to be surveyed using a sample frame stratified by hunter community of residence. The overall response rate of those who received surveys is usually around 60 percent. Because response rates differ by community, the responses received from each community are multiplied by different expansion factors to arrive at estimates for each community. The higher a community's response rate, the more likely the data represent actual hunting effort and harvests of all deer hunters within that community (Straugh et al. 2003).

Research surveys—

Research surveys can be used to verify and refine visitor monitoring information for specific areas or for specific visitor monitoring purposes. An example of this is research conducted by the Aldo Leopold Institute on the Tongass National Forest, Yakutat Ranger District (Christensen and Watson 2006; Christensen et al. 2004, 2007). The research was adapted to work effectively for local conditions by developing different methodologies to assess nonlocal and local visitors to the Situk River—the major recreation use area on the district. Because of the Situk's remoteness and the dispersed use, both groups were sampled offsite. The nonlocal visitors were intercepted at the Yakutat airport (which represents the major portal for nonlocal visitation) and asked to complete a survey about their current trip to the river. Local use was assessed by conducting surveys with local residents about their yearly activity patterns on the river, which better captured the spectrum of use by Yakutat community members. The community surveys were conducted in person to address known problems with response rates for mail-based surveys in the local community. This study provided detailed information about visitor behaviors that would be useful in calibrating visitor use monitoring models for the Yakutat Ranger

District. The detailed surveys could be redone as resources permit to recalibrate the monitoring.

Alaska Department of Transportation Measures

A number of transportation measures are available that show the movement of visitors and residents in, out of, and around Prince William Sound and southeast Alaska. A number of changes have recently occurred to transportation access to Prince William Sound, including the Whittier Tunnel road access and a new high-speed ferry providing faster and more frequent ferry service. These have reduced both the dollar cost and the time cost of travel in the region. In addition, some large cruise ships are docking in Whittier rather than Seward to reduce travel time to Anchorage and Denali National Park and Preserve. It is likely that travel patterns will continue to evolve and shift during the next few years as a result of these changes in access and costs.

For Prince William Sound, traffic data show that an increasing number of both vehicles and visitors are using the Whittier Tunnel. Richardson Highway traffic counts seem fairly stable. Regular fast ferry service resulted in a significant jump in ferry ridership and a corresponding reduction in air passengers as a result of the more frequent, lower cost option (tables 2 and 3). For more information on obtaining transportation data including the Whittier Tunnel vehicles and visitors, road counts, ferry embarkments, and airport and railroad passenger counts, see appendix 2.

Alaska Department of Natural Resources Cabin and Guide Permit Data

There are 14 Alaska state marine parks in the Prince William Sound region. None have rangers or staff assigned to the area and thus no counts of visitors are made in the field. The Prince William Sound marine state parks include the following:

- Near Cordova: Kayak Island, Canoe Passage, Boswell Bay.
- Near Whittier: Decision Point, Ziegler Cove, Entry Cove, Surprise Cove, Granite Bay, South Esther Island, Bettles Bay, Horseshoe Bay.
- Near Valdez: Shoup Bay, Sawmill Bay, Jack Bay.

The only Prince William Sound state marine parks with visitation data are South Esther Island and Shoup Bay (table 4). Park estimates for southeast Alaska range from fairly consistent for Sitka and Haines parks to almost no visitor counts in other areas.[5]

[5] Information on individual park units and their locations can be found at http://www.dnr.state.ak.us/parks/units/index.htm.

Table 2—Whittier Tunnel visitor estimate and vehicle counts[a]

Year	Visitors	Vehicles
2000	274,577	176,106
2001	253,161	172,986
2002	262,827	188,470
2003	268,149	199,604
2004	509,439	232,136
2005	478,651	240,514
2006	488,684	235,326
2007	463,871	238,059

[a] Includes residents and nonresidents. Years 2002 and 2003 are higher because of winter ferry traffic, and years 2004 and 2005 are higher because of tank farm remediation. Year 2007 value for vehicles is based on 8 months measured and extrapolated to the year.
Source: Burton (2007).

Table 3—Prince William Sound ferry embarkments

Year	Whittier	Cordova	Valdez	Chenega	Tatitilek
1997	9,393	5,414	4,089	7	24
1998	8,669	5,077	4,030	11	18
1999	8,097	5,088	3,874	12	14
2000	8,285	5,075	4,058	22	24
2001	7,891	5,438	3,974	21	25
2002	8,244	5,769	3,840	15	26
2003	8,141	6,293	3,913	5	23
2004	8,240	5,132	4,098	10	22
2005	9,712	8,136	3,292	49	19
2006	18,189	11,532	4,223	20	24

Source: Alaska Marine Highway System (1998-2007).

Table 4—Visitor estimates for South Esther Island and Shoup Bay state marine parks

	South Esther Island				Shoup Bay				
Year	Hikers	Other commercial	Commercial vessel	Total	Cabin	Hikers	Other commercial	Commercial vessel	Total
1999	0	0	0	0	0	0	0	0	0
2000	0	0	0	0	174	0	0	0	174
2001	0	0	0	0	578	0	0	0	578
2002	0	0	0	0	744	0	0	0	744
2003	0	0	0	0	624	0	0	0	624
2004	0	0	0	0	721	0	0	0	721
2005	0	0	9,300	9,300	687	0	0	0	687
2006	0	0	0	0	892	0	0	0	892
2007	2,131	9,031	0	11,162	819	819	1,483	0	3,121

There are also 17 state parks on the Kenai Peninsula, many of which are adjacent to the Chugach National Forest. There are approximately 20 additional park units in southeast Alaska with different proximity to the Tongass National Forest. Unfortunately, most Alaska state marine parks have few if any rangers present. As a result, visitor counts are not reliable, especially for noncommercial and noncabin activities. For information on receiving Alaska state park visitor information, see appendix 2.

Alaska Visitor Data Collection Processes Used by Other Agencies

When contacted, a number of recreation planners in Alaska mentioned that they thought the USDA FS has better visitor estimation systems and that they have been implementing techniques learned from USDA FS workshops and publications.

National Park Service

Katmai and Lake Clark National Park and Preserves, Aniakchak National Monument and Preserve, Alagnak Wild River—

These parks in southwest Alaska share a concessions program and reporting system recently developed by the National Park Service (NPS), Southwest Alaska Network (SWAN), Inventory and Monitoring program (fig. 3). The first step in developing the new system was extensive interviews with park staff and commercial operators. This helped to identify management practices of park field staff and commercial holders as well as identify visitor travel patterns and visitor estimation system strengths and weaknesses. This information was used to develop diagrams (app. 3) to facilitate system analysis.

The goal was an improved system that also dovetailed well with the daily practices of park staff and commercial permit holders so it would be readily implemented, supported, and maintained. The resulting new reporting system attempts to track visitor use primarily through annual reporting by companies that hold concession licenses and commercial use authorization (CUA) permits. The reporting is done when commercial operators file their annual reports and make fee payments for each year. These visitor estimates form the basis of the official visitor counts reported to the NPS Denver Service Center.

The visitor tracking forms and instructions are emailed to permit holders each year and are also available to be downloaded from the NPS Web site. Permit holders are encouraged to complete the forms electronically and submit them via e-mail. Alternatively, they can print out the forms and submit the completed forms by regular mail. The data are loaded into a Microsoft Access database that has been programmed with a number of automatic reporting options. There is a Web-

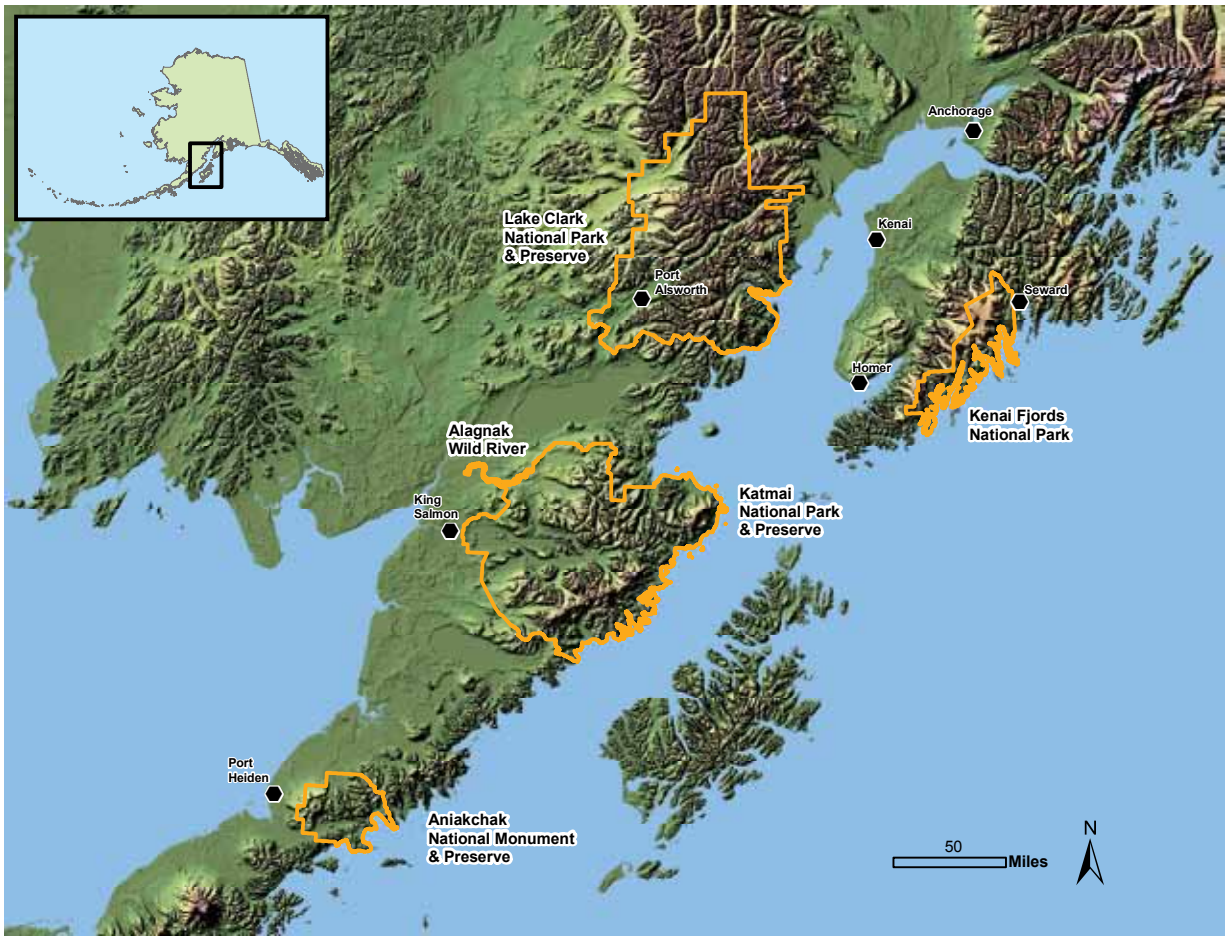

Figure 3— Southwest Alaska Network of Inventory and Monitoring National Parks.

accessible database search mechanism for a subset of reports on the NPS, SWAN Inventory and Monitoring Web site. Annual reports are sent to permit holders along with electronic forms each year.[6]

In addition to the CUA annual activity forms, field data forms and protocols were also developed for use by staff in the field to collect visitor use observations. They contain data fields similar to those in the CUA form. Both forms and databases contain similar location codes and abbreviations and units of measurement. The field reports data are entered either directly into a field data Access database or entered into Excel spreadsheets and later transferred to the database. The CUA and field data databases can be cross referenced by relating similar fields such as dates, locations, and CUA identification numbers. However, these remote parks do not have sufficient backcountry ranger presence to use ranger observations as a basis

[6] The visitor use activity forms for Lake Clark National Park and Preserve can be found at http://www.nps.gov/akso/concessions/index.cfm?theme=cua_lacl.

for estimating visitor numbers. The exceptions to this general rule are three locations in Lake Clark National Park and Preserve—Silver Salmon Creek, Telaquana Lake, and Twin Lakes—where seasonal rangers are located for most of the peak visitor season—June through August. At these three locations, the ranger data are being considered for use as the official location visitor count rather than the numbers obtained from CUA permit holder reports.

Kenai Fjords National Park—

Kenai Fjords National Park is also part of the NPS Southwest Alaska Network and participates in the SWAN Inventory and Monitoring program. However, Kenai Fjords collects its visitor information differently than the other network park units because of different visitor use patterns. First, there is no fee for CUAs bringing visitors to Kenai Fjords National Park. As a result, park staff do not think the annual CUA reporting is sufficiently accurate or detailed to use for visitor estimates. In addition, Kenai Fjords National Park was created under the Alaska National Interest Lands Conservation Act (ANILCA). All Alaska ANILCA park coastal boundaries are the mean high tide line. Therefore, any commercial operator that drops park visitors below the mean high tide line is not required to obtain park permits or report visitors carried to the parks. The majority of Kenai Fjords National Park backcountry visitation occurs via boats and water taxis.

Second, a significant portion of park visitation occurs at the Exit Glacier visitor center and via marine tour vessels. At Exit Glacier, vehicle traffic counters are used to estimate the number of visitors. Every 3 to 5 years, observations of vehicles and counts of passengers within vehicles are made in order to calibrate the road count mechanism with an estimate of the average number of passengers per vehicle. Marine tour vessels are not required to report visitor numbers because the vessels are not technically in the park, but all of the tour companies have entered into voluntary agreements with the park to provide monthly passenger counts. Park naturalists provide interpretive information on many of the vessels. The marine vessel tour passengers are also included in the park's official visitor numbers even if they do not go on shore, because the primary motivation for the trips is to view the park. Exit Glacier counts and the marine tour vessel counts are similar to "proxy" locations used under the USDA FS NVUM protocol.

To address remotely accessed backcountry park use, Kenai Fjords uses two approaches. The first is ranger backcountry patrol visitor observations. Since 1994, park staff have recorded ranger visitor observations in a field form and stored the data in an Access database. Under the NPS SWAN visitor use monitoring project, units of measurement and location abbreviations for Kenai Fjords were also stan-

dardized and made consistent with those used in Katmai, Lake Clark, Aniakchak, and the Alagnak Wild River.

The most substantial change to the Kenai Fjords National Park ranger observation protocol under the revisions introduced by the SWAN monitoring project was to initiate the recording of ranger days in the field. This same protocol was implemented for all the SWAN park units. This enables the number of visitor-days per ranger observation day to be calculated for each park as well as applicable locations within each park. Without any record of ranger observation days or measure of sampling effort, it is not discernable whether the number of observed visitor-days reflects a change in the actual number of visitor-days or a change in measurement effort. In discussions with park staff, it became apparent that rangers in the field have too many other responsibilities to establish routine, systematic sampling frequencies—similar to wildlife observation transects—as a mechanism for estimating visitor numbers.

As its second approach to backcountry use data collection, Kenai Fjords National Park also implemented a voluntary backcountry registration (VBR) program in 2000.[7] In 2004, it became mandatory for CUA permit holders to return VBR forms for all their guided trips within the park. Park staff are also working with water taxis, kayak rental companies, and other locations with visitor contacts, including their Seward visitor center, to distribute the VBR form to unguided visitors.

As part of the SWAN monitoring project revisions, a data field was added to the backcountry observation form for rangers to record whether a visitor encountered in the field had a VBR form when contacted by rangers. If so, the unique VBR identification number is included with the ranger observation data for the visitor group. If not, the ranger provides the visitor group with a VBR and records its identification number on the field observation data form. Collectively, by tracking unique VBR numbers, noting whether visitor groups had a VBR form when encountered in the field, calculating the ratio of guided to unguided visitors encountered in the field, and recording ranger days in the field, it is possible to mathematically improve visitor estimates and relate the ranger and VBR data sets. This sampling strategy is similar to having radio-collared wildlife or tagged fished in a population sampling protocol. By estimating visitor VBR return rates and relating data from each data set, estimates of visitor numbers can be more accurately estimated than possible from each sampling method in isolation. Data from the VBR program are stored

[7] The program is voluntary because provisions of ANILCA have been interpreted to disallow mandatory visitor registration with or without fees.

and retrievable from an Access database. By using the VBR identification number, the two databases (VBR and ranger field data) can be related to each other.

Kenai Fjords National Park backcountry rangers primarily patrol in Aialik Bay, the most visited backcountry use area. However, there is a large portion of the park that is not routinely patrolled. Park management is considering doing periodic, systematic overflights to gather some information on use in these more remote parts of the park. Although funding availability is unlikely to support sampling intervals that would enable accurate estimates of visitor use given the relative low level of current use, it would be a mechanism to track trends and alert park management to when visitation reaches a level that warrants expansion of backcountry ranger patrols.

Another action Kenai Fjords National Park uses to help track visitors is the installation of counters on public-use cabin doors and bear-proof food lockers located throughout the park backcountry. Although they have not calibrated the opener counts to estimate visitor numbers, it does help determine frequency of use of particular locations, especially as some cabins are used without reservations. With the data the park already has on cabin use, backcountry party sizes and average lengths of stay, the counters could be calibrated to provide additional estimates of visitation for unguided visitors. Similarly, the park has had a trail counter at the Harding Icefield trail.

Collectively, these methods provide reasonable estimates of the number of park visitors. See appendix 3 for system diagrams of the SWAN park units' visitor estimation methods.

Denali National Park and Preserve—
Approximately 400,000 people visit Denali National Park and Preserve each year, arriving by a variety of modes and engaging in a number of activities (table 5). Private vehicle use is quite limited and the park operates its own bus system (via concessionaires). These factors make the task of estimating visitor use simpler in some ways and more complicated in others. Because private vehicle use is so limited, most visitors take a bus into the park. These visitors—including many who arrive by train—are counted with great accuracy. However, because there is no traditional ranger kiosk at the main park entrance, visitors arriving by vehicle (or by train) who remain in the entrance area or who drive their private vehicle on the first 17 miles (27.2 km) of the park road are not easily counted. Based on a survey of vehicles entering the park in 1995, the park staff estimates that approximately 25 percent of visitors to the Nenana Canyon front country do not take a shuttle bus or bus tour. Unfortunately, this ratio has not been updated with new empirical data since 1995.

The procedure for developing annual visitor estimates can be summarized as the following:

Annual bus passenger counts
plus estimated summer visitors not taking buses (25 percent of bus passenger count)
plus bicyclists counted at the mile 17 Savage River ranger kiosk
plus passengers in private vehicles traveling the park road to private inholdings
plus visitors to the Talkeetna Ranger Station (located 120 miles away and outside the park boundary)
plus passengers on scenic air tours who landed in the park
plus winter visitor estimates
equals total number of estimated recreation visits.

Table 5—Annual recreation visit estimates for Denali National Park and Preserve

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Total recreation visits (MPUR)[a]	341,385	354,278	372,519	386,867	363,983	360,191	311,335	360,189	404,236	403,520	415,935
Total recreation visits (formula):		354,639	372,548	386,866	364,019	360,271	353,560	359,838	404,234	403,520	415,935
Winter use[b]		1,395	1,355	974	981	901	5,782	6,910	9,270	15,803	10,534
Visitors on buses		274,150	292,876	304,485	287,357	274,401	261,685	255,739	288,121	291,258	297,889
25% of visitors on buses[c]		68,539	73,219	76,121	71,839	68,600	65,421	63,935	72,030	72,815	74,472
Bicyclists at Savage Box		99	132	203	249	139	111	112	235	262	226
Visitors in private vehicles[d]		4,184	3,309	3,822	3,362	1,439	1,356	1,325	4,105	1,626	2,053
Registered mountain climbers		1,229	1,309	1,759	1,715	1,989	1,753	1,823	1,997	2,104	1,700
Scenic air tour[e]		4,688	0	-678	-1,709	0	8,092	8,872	9,520	2,288	10,749
Talkeetna Ranger Station[f]		356	348	480	225	12,802	9,360	21,122	18,956	17,364	18,312

[a] The annual visit total reported by the Monthly Public Use Report (MPUR). These figures differ from the total indicated by the results of the formula because of both explicable and inexplicable reasons. In 2002 and 2003, adjustments to components were made after the conclusion of the calendar year when "total recreation visits" was already set.

[b] All visits between October and April, except climbers.

[c] Intended to estimate the number of visitors who spend time in the park entrance area but do not travel past Savage River. The figure is based on a visitor survey done in 1995.

[d] Includes Kantishna calendar permits, road lottery visitors, and visitors traveling on handicap permits.

[e] Inaccurate reports retained here for expository purposes.

[f] Prior to 2001, these figures appear to have captured voluntary backcountry registrations at Talkeetna, although in some years there may have been double counting with "registered mountain climbers." Post-2001, this category contains visitor counts from the Talkeetna Ranger Station.

Data source: National Park Service Monthly Public Use Report.

Denali does have a backcountry registration program, but most backcountry users ride buses to reach trailheads or leave from the front country and are included in the 25 percent non-bus-tour visitor estimate (Brigham et al. 2006).

Gates of the Arctic National Park and Preserve—
Gates of the Arctic National Park and Preserve (GAAR) uses a variety of methods to estimate the number of visitors to the park (fig. 4). These include visitor contacts at ranger stations, backcountry safety orientations, a voluntary visitor registration form, and a loaner program for bear-resistant food canisters (BRFC). Park regulations require backcountry visitors to use BRFCs for food storage. Together, the backcountry orientation and BRFC checkout are the mainstays of the GAAR visitor tracking program. Backcountry visitor safety orientations are given at:

- Fairbanks Alaska Public Lands Information Center.
- Arctic Interagency Visitor Center (Coldfoot).
- GAAR Ranger Station (Bettles).
- GAAR Ranger Station (Anaktuvuk Pass).

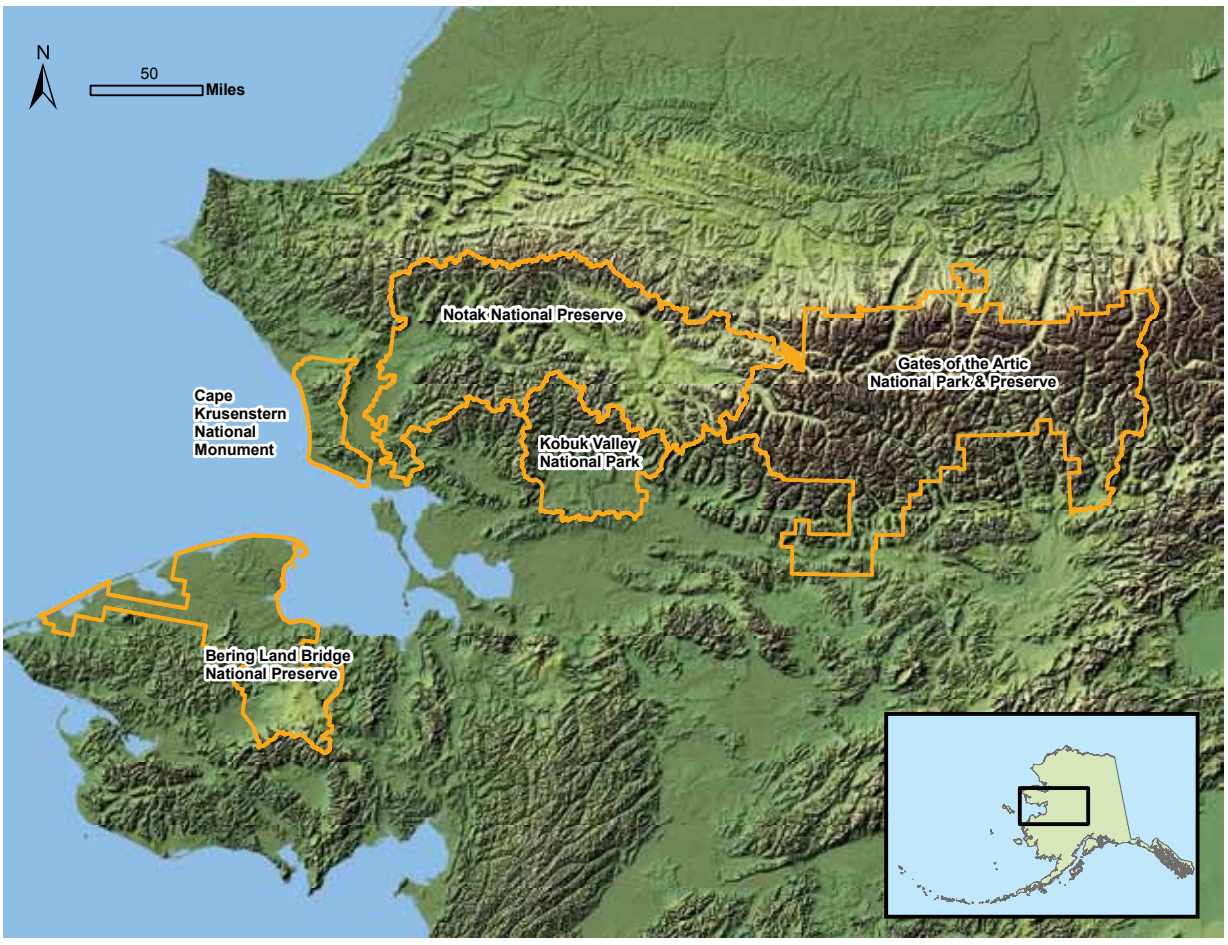

Figure 4—Gates of the Arctic National Park and Preserve and other National Park Service units in northern Alaska.

Although GAAR does not have a mandatory permitting process, there are a number of ways that they encourage visitors to attend a backcountry safety orientation and complete a visitor registration:

- Independent travelers are not required to have a backcountry orientation, but they are required to take precautions in bear country, and the park has a free BRFC loaner program. The form visitors fill out asks for their trip information (dates in/out, place in/out, route, number in party, etc.) and advises visitors that the information will not be used to track them but would facilitate the search and rescue process should they be reported overdue. In addition, the form for checking out BRFC includes the visitor registration form.
- Commercial operators (guides, air taxies) must be permitted, and a condition of that permit is that their clients receive a backcountry safety orientation. So if the operator is compliant, information on guided visitors is captured.

So, although GAAR does not require visitor permits or registration, the backcountry safety orientation and BRFC loaner program allows GAAR to collect good information on most parties with whom they have contact.

The park's prior superintendent discouraged rangers making contact in the backcountry. This was counter to research done by the Aldo Leopold Research Institute, which indicated that ranger contacts contributed to a positive wilderness experience rather than detracted from that experience. However, since 2000, the chief ranger has encouraged the rangers to make contact with visitors and to try to ascertain if the groups had received a backcountry safety orientation or loaner BRFC, or had registered. This information is used to estimate the number of visitors not receiving orientations or checking out BRFCs. Air taxi reports submitted at the end of the fiscal year by commercial operators permitted to drop visitors in the park are also used to refine visitor estimates.[8]

Depending on aircraft and pilot availability, airborne counts of visitors are also made at some locations during the busiest visitation periods. The aircraft is owned and operated by GAAR, which makes aircraft use less cost prohibitive. The cost to conduct visitor aerial surveys is only the marginal cost of additional flight hours of operation, as the aircraft and ranger pilot are already sunk costs. The surveys are used to ground truth the other estimates.[9]

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[8] Christian, Peter, 2008. Personal communication. Dalton Corridor District Ranger, Gates of the Arctic National Park and Preserve, 4175 Geist Road, Fairbanks, AK 99709.

[9] Pendergrast, Don, 2008. Personal communication. Chief of Interpretation and Education, Gates of the Arctic National Park and Preserve and Yukon-Charley Rivers National Preserve and manager, Alaska Public Lands Information Center, 250 Cushman Street, Fairbanks, AK 99701.

A visitor research project completed in 2003 by the Aldo Leopold Wilderness Research Institute used a visitor access portal survey method, which sampled visitors traveling to Gates of the Arctic via air taxi operators based in Fairbanks (Kneeshaw et al. 2003). The Fairbanks airport was determined to be the access portal for approximately 80 percent of GAAR backcountry visitors. Another 10 percent of visitors each entered from the Dalton Highway and Kotzebue, respectively. Based on the survey results, a protocol was developed to use air taxi manifests and Dalton Highway road counts in subsequent years to estimate visitor use. However, the use of this protocol was never implemented because of insufficient funding and staff (see footnote 9).

Don Pendergrast, now with GAAR, was previously responsible for visitor estimates for the Yukon-Charley Rivers National Preserve. Under his leadership, visitor estimates for Yukon-Charley Rivers National Preserve were based on counts of recreational boaters stopping at the Frank Slaven's Roadhouse. This roadhouse was used until the 1950s and was listed on the National Register of Historic Places in 1987. It has been restored for use as a visitor contact area and public use facility. A stratified sampling schedule was used to estimate the number of recreational boaters. Because almost all stop at the Roadhouse, this process provided a reliable recreational boater visitor estimate. The only major group missed with this technique was hunters. This sampling process was discontinued with personnel changes (see footnote 9).

Bureau of Land Management

The Bureau of Land Management (BLM) manages more than 70 million acres in Alaska once all remaining land transfers to the state and to Alaska Native corporations are accounted for (fig. 5). Visitor estimates are conducted and reported by area outdoor recreation planners based on locally implemented methods tailored to the characteristics of the lands within a specific region. The accuracy of the estimates most likely varies depending on land access characteristics, commitment by the area planner, and longevity of the area planner in the position. Area recreation planners enter visitor use estimates directly into the Recreation Management Information System database used by BLM.[10]

Most of the BLM Alaska Region outdoor recreation planners attended a USDA FS visitor estimation workshop offered about 6 years ago by the Aldo Leopold

[10] Overbaugh, Bill, 2008. Personal communication. Outdoor Recreation Planner, Branch of Resources and Planning, Bureau of Land Management, Alaska Region, 222 W 7th Avenue, No. 13, Anchorage, AK 99513.

Wilderness Research Center. The methods taught in that workshop form the basis of most of the Alaska region BLM visitor estimation efforts.

White Mountain National Recreation Area—
As a result of limited field personnel spread across millions of acres of land, the BLM approach is to first focus on visitor estimates at key access points and areas of concentrated use. These visitor counts are supplemented by an estimate of "dispersed use," which is primarily a professional estimate based on local knowledge and experience. The dispersed use estimate is "whittled down" over time as estimates are improved for specific trails, campgrounds, and road access points. In this area, as well as on most BLM land across Alaska, outdoor recreation use planners rely extensively on technologies such as infrared trail counters, road traffic

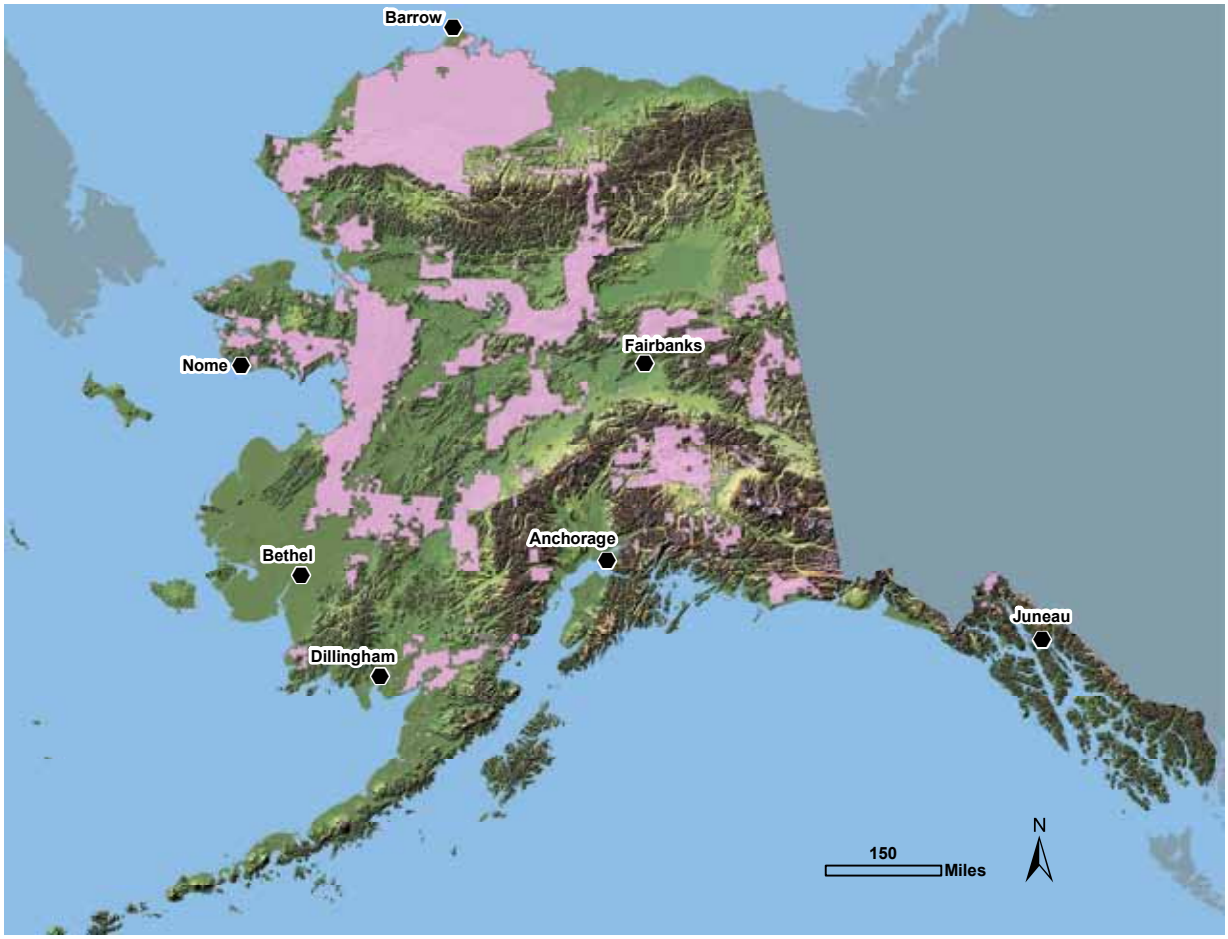

Figure 5— Bureau of Land Management lands in Alaska (shaded in pink).

counters, and cabin and campground registrations.[11] Trail and road counters are primarily TRAFX and Cuesta counters.[12]

In addition to trail, road, cabin, and campground counts, the White Mountain planner conducts visitor census overflights on two wild and scenic rivers that BLM manages—Beaver Creek and Birch Creek. Prior to the overflight surveys, BLM staff had no reliable numbers on use—in part because the river is primarily used by unguided parties. These parties usually float over a 100-mile (161 km) stretch of Beaver Creek in 6 to 7 days. There is road access to the usual put-in point, and most parties take out at a location with air taxi access. Birch Creek can be surveyed during the return flight after surveying Beaver Creek.

To develop a baseline estimate of use, overflights were conducted during the summer season for 3 years. During the first season, overflights were conducted every 4 days. During the second and third years, flights were conducted once a week based on pilot availability and costs. Given the length of time most parties spend on the river, weekly flights allow for most parties to be surveyed yet avoid double-counting. This schedule also reduces intrusion. The counts include visual observations of group sizes as well as boat type and color to distinguish parties in case they are still on the river during the subsequent survey. During the first year, the survey process also uncovered two guides using Beaver Creek without the required commercial permits.

South-central Alaska—

In south-central Alaska, eight trail locations have trail counters. These are at trailheads or on trails where users enter BLM land—either from roads or from other public lands. In addition to trail counters, buried loops are installed in the road to count vehicles at road access points to BLM land. Access points are surveyed to estimate the average number of occupants in vehicles to develop a factor to apply to estimate the number of visitors.[13]

Planners also note that it is fairly easy to identify when a trail counter has a distorted day count and to adjust the data accordingly. Distorted counts are most often due to heavy snow precipitation interfering with the infrared counter. The technique used by the south-central planner is to extrapolate from data for the same day the previous year to assign a count for the missing or bad data.

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[11] Cogley, Colin, 2008. Personal communication. Outdoor Recreation Planner, Fairbanks Field Office, Bureau of Land Management, Alaska Region, 1150 University Avenue Fairbanks, AK 99709.

[12] For more information see www.trafx.net/index.htm and www.cuestasystems.com.

[13] Ballou, Douglas, 2008. Personal communication via email to Ginny Fay. Outdoor Recreation Planner, Anchorage Field Office Bureau of Land Management, Alaska Region, 4700 BLM Road, Anchorage, AK 99507.

The south-central planner believes that the trail counters provide a very reliable minimum number of users on BLM trails. All the BLM recreation planners contacted think the counters are providing reliable data for determining visitation trends. The estimates have been ground truthed using volunteers doing spot hand counts at the counter locations. The BLM planners consider this critical to build confidence in the units and to ensure they are placed in the best locations.

Steese National Conservation Area—

The BLM Steese National Conservation Area recreation planner uses a variation on the techniques mentioned above, selecting those best suited for dispersed recreation uses, as there are no campgrounds or developed infrastructure in the Steese area.[14]

The primary methods used for estimating visitor numbers in the Steese Area are infrared trail and traffic counters, trailhead registration kiosks, and counts of vehicles in parking lots. To initiate the process, a 3-year field observation survey was conducted from 2002 through 2004 using seasonal employees to count the number of visitors, passengers in cars, and people on trails at river and trail waysides and parking areas. This was done simultaneously with installing infrared counters and trail registers. The fieldwork was used to help locate the infrared counters in locations that provide the most accurate visitor counts. In addition, the field observations were used to:

- Estimate from all passing vehicles the proportion with passengers who visit BLM lands.
- Determine visitor activities and trip characteristics—day versus overnight visitors, activities pursued, and party size.
- Develop counts of passengers per vehicle to apply as factors to future infrared vehicle counts.

The area planner would like to repeat the field observation process every 5 years to recalibrate the factors applied to trail and road counters. When additional field observations are done, the plan is also to correct the sampling strategy. The first time the sample was not stratified to account for weekday vs. weekend observations. When the next surveying occurs, this issue will be remedied.

In general, most of the BLM outdoor recreation planners believe that their visitor estimates provide reasonably accurate minimum estimates. The areas receive relatively few visitors so they believe that the cost and efficiencies of their procedures are in balance with the need for precision.

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[14] McClain, Holli. 2008. Personal communication. Outdoor recreation planner, Eastern Interior Field Office, Steese national conservation Area, Bureau of Land Management, Alaska Region, 1150 University Avenue, Fairbanks, AK 99709.

U.S. Fish and Wildlife Service

The Fish and Wildlife Service (USFWS) has a workbook with procedures for estimating visitors to refuges and programs (U.S. Fish and Wildlife Service 2005). The Visitation Estimation Workbook is intended for USFWS employees responsible for estimating and reporting visitor numbers on refuges and wetland management districts. The workbook provides guidance that helps staff to design an appropriate plan for estimating and reporting visitor numbers and to identify the best methods currently available to implement that plan. The recommendations are targeted separately toward road-accessible and non-road-accessible ("remote") refuges.

The USFWS definitions of "visitors" and "visits" are different from those used by most other federal and state land management agencies in Alaska. Most land management agencies track the number of visitors and visitor-days. Under these definitions, the visitor can do multiple activities or leave and reenter in the same day but still only count as one visitor making one visit to the site. Generally, a visitor is someone who enters public land above mean high tide and is not a government employee or contractor; a visit is an entrance; and a visitor-day is one person visiting for 4 hours or more.

In contrast, according to the USFWS workbook, the total number of visitors to a station on a given day is not based on the duration of the visit. A visitor who stays for 15 minutes is counted the same as a visitor who stays the entire day. The USFWS defines a visit as the entry of one person onto refuge land to engage in one recreational or educational activity; a visit is not the same as a visitor. One visitor could account for several visits to the station in a single day simply by participating in several activities. The counts of the numbers of visitors who participated in each of the activities during the year compose the "visits" associated with those activities. Activity ratios are developed based on the proportion of visitors who participated in a particular activity. Using these ratios, the total numbers of visitors can be estimated based on specific activity counts. Conversely, activity counts can also be estimated based on counts of total visitors. The USFWS visitor estimation efforts are oriented toward interpretive and education program delivery, rather than toward estimates of visitor-days and visitor and trip characteristics.

According to Brian Glaspell, Visitor Services Manager for Kodiak National Wildlife Refuge (fig. 6), there is no single consistent protocol for Alaska refuge visitor estimation. Having previously worked for the USDA FS and taught visitor estimation techniques, he believes that among the federal land management agencies in Alaska, the USDA FS generates the most rigorous visitor estimates. Whereas, nationally, the USFWS visitor estimation protocol focuses on whether

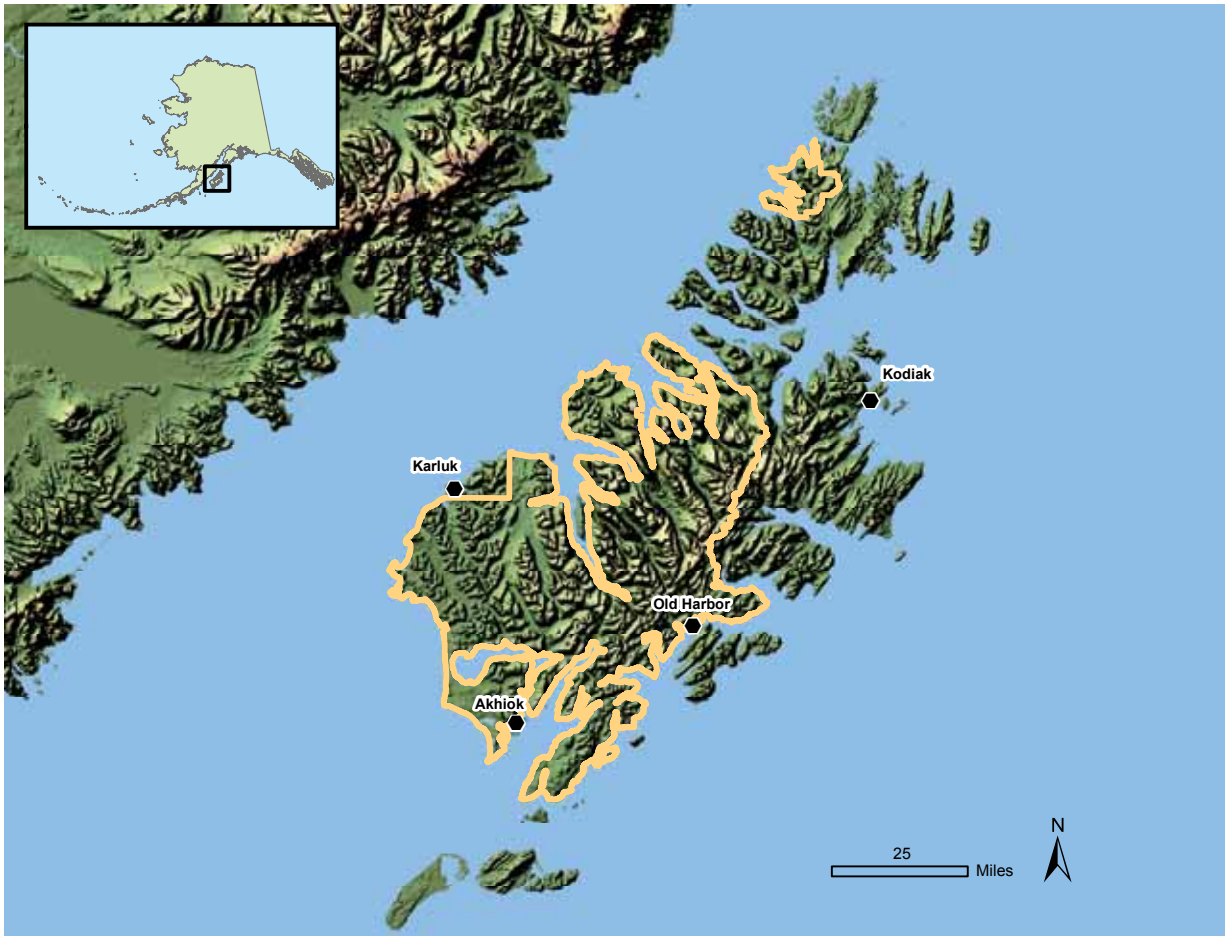

Figure 6— Kodiak National Wildlife Refuge, Alaska.

a refuge is road-accessible or remote, according to Glaspell, the more relevant distinction in Alaska is between gateway access and dispersed access. In a refuge with gateways access, most trips originate or are funneled through a small number of entry points. With dispersed access, visitors begin and end trips at numerous remote access points.

Kodiak Wildlife Refuge is an example of a refuge with dispersed access. As a result, Kodiak Refuge visitor estimation efforts are focused on reports from permitted guides, cabin reservations, and river use permits. These sources provide reliable estimates, especially as the potential for limiting future use gives guides an incentive to accurately report use to preserve their rights to grandfathered use.[15] Kodiak Refuge has a standardized guide and air taxi reporting form that asks for reporting of saltwater visitor dropoffs below mean high tide, even though no fee is paid for these visitors. Refuge managers believe that these sources provide a reasonable

[15] We presume that permit fees serve as an incentive to not overreport commercial use.

minimum estimate of visitors. The minimum estimate is adjusted using professional experience, judgment, and a review of trends to derive an estimate of the total number of refuge visitors.

Glaspell reports that although he used to be skeptical of this approach, he has respect for these seasoned professional judgments after working with a specific refuge with long-term professionals and a small number of commercial outfitters and air taxi operators. The remaining dispersed use accessed from saltwater, especially use by the commercial fishing fleet, is nearly impossible to survey accurately given the refuge's level of staffing and funding. According to Glaspell, visitor counts for the Kenai National Wildlife Refuge are based on Alaska Department of Transportation and Public Facilities' (DOT) traffic counters on the Sterling Highway, campground and cabin reservation, voluntary trailhead registration, and guide reports. Similarly the Tetlin Wildlife Refuge relies on DOT traffic counters. All of the refuges keep counts of visitors to refuge programs and visitor centers, as applicable.

According to Glaspell, the Alaska Big Game Commercial Services Board, which regulates big game guides and transporters, may decide to require more extensive reporting by transporters who drop hunters off along saltwater coastlines. If this occurs, considerably more information will be available to upland land managers regarding the number of visitors accessing remote locations via saltwater dropoffs.[16]

Alaska Department of Natural Resources, Division of Parks and Outdoor Recreation

The Alaska Division of Parks and Outdoor Recreation makes visitor estimates using onsite ranger counts, cabin reservations, and outfitter/guide reports. Unfortunately, most Alaska state parks are understaffed, and marine parks have few if any rangers present owing to insufficient funding. As a result, visitor counts are not reliable, especially for noncommercial and noncabin activities.[17]

Visitor Use Estimation Techniques From Areas Outside Alaska

General Perceptions

We reviewed the literature and contacted other researchers (see app. 2) for examples of visitor use estimation techniques in areas outside of Alaska. The results of the literature search are included in appendix 4. The literature review includes visitor

[16] For followup on these regulations see http://www.dced.state.ak.us/occ/pgui.htm.
[17] King, James, 2008. Personal communication. Director, Alaska Department of Natural Resources, Division of Parks and Outdoor Recreation, 550 W 7th Ave., Suite 1260, Anchorage, AK 99501-3557.

use impact studies and economic impact analyses, both of which require estimates of visitor use. These impact studies complement the comparatively sparse published and agency literature on visitor use estimation techniques.

For the majority of visitor use impact monitoring and economic impact analyses, researchers conducted surveys or employed one-time techniques to estimate the number and types of visitors to the location(s) under investigation. This step was necessary because a reliable, ongoing process for estimating the number of visitors was not available. In addition, expenditure information was often collected as part of the visitor use estimate. These studies contain descriptions of visitor survey methods used by the investigators.

The researchers we contacted shared the following perceptions regarding visitor use estimation:

- All agencies are struggling with developing reliable visitor use estimates and maintaining a consistent system for collecting and storing data over time.
- Proven techniques are available for estimating visitor numbers if appropriate resources are committed to the task.
- The fundamental problem with developing visitor estimates is insufficient budget and staff.
- It is cost-prohibitive to survey use at locations in dispersed backcountry settings that receive little use. Any data collected from these locations are not worth the costs. Concentrating surveys and visitor estimation equipment and techniques at the more highly visited areas provides adequate data for visitor estimates at costs that allow for sustained data collection.
- Techniques that combine data from more than one type of sample can significantly improve the accuracy of visitor counts without dramatically increasing costs. Two examples of these techniques are (1) trail counters combined with periodic visitor surveys and observations at trail heads and (2) visitor permit registrations combined with ranger observations noting the number of visitors with permits. These techniques are especially effective if any of the sampling methods are tied to ongoing activities such as orientations, bear canister loans, or ranger patrols.
- There is a lack of clear management objectives and communication of those objectives to field staff regarding the collection of visitor use data. Both this lack of clear objectives and insufficient knowledge among field staff of statistical techniques mean that staff cannot easily develop robust sampling plans that generate data appropriate for the objectives. Without robust sampling plans or prespecified objectives, visitor counts are generally unreliable for whatever purpose they are eventually used.

- Many land management agencies are overly focused on biological surveys of fish and wildlife resources and not focused enough on visitor estimation despite the fact that humans are the only species that can actually be managed.
- No land management agency has developed any innovative "blockbuster" technique or technology to overcome the funding shortfall.
- The USDA FS is the leader in developing equipment, such as trail counters and sampling techniques used for NVUM. Most agencies look to USDA FS recreation researchers for best practices and innovations in visitor use estimation.
- The USFS Region 10 forests add another dimension of complexity to visitation estimation given the dispersed open access available along hundreds of miles of saltwater shorelines.

Specific Recommendations

Jeffery Marion, USGS, (see app. 2 for interviewee information) recommends two potential lower-cost methods—visitor permits and commercial guide and outfitter permits. He suggests a required—as opposed to voluntary—visitor backcountry use permit. Owing to the remote locations of the forests and their multiple access points, managers could dispense permits to visitors via the Web, e-mail, or phone. Because a large proportion of visitors pay someone for some type of transport to the Region 10 national forests, businesses that transport visitors and outfitter/guides could be required to report visitation to the USDA FS. This reporting could be part of the annual special use permit reporting requirements. Jeffery Marion doubts that any ground-based techniques would work on Region 10 forests because the use levels are too low and the use is too dispersed except at major attraction sites.

David Cole, Aldo Leopold Wilderness Research Institute (ALWRI), suggested conducting overflights to count marine vessels along the shoreline. During the first season of these flights, an extensive one-time field survey could be conducted to identify what portion of boat passengers visit USDA FS uplands as well as visitation information such as locations visited, party size, activities, and length of stay. This information could be used to estimate dispersed saltwater-accessed use from overflight surveys conducted in subsequent years. The overflight information could supplement visitation data from proxy sites, cabins, trail counters, and road counters.

Alan Watson, ALWRI, stated that the only places with reliable visitor counts have backcountry permits coupled with survey techniques to estimate the proportion of visitors who do not complete permits. He also noted that the debate over

the pros and cons (invasiveness) of permit systems that started in the 1970s still continues. The general trend is a decline in visitor permit and registration systems in the West.

John Loomis, Colorado State University, suggested using automated technologies to the maximum extent possible to collect data in the field at dispersed areas such as trails, trailhead parking lots, cabins, and campgrounds. This automated information could be calibrated with field surveys. He also recommended that all visitors be surveyed rather than the NVUM protocol of only interviewing visitors departing on the last day of their trips. Because one of the problems with gathering information on dispersed visitation on Alaska forests is the low number of visitors across millions of acres, the practice of not sampling all visitors exacerbates this problem and foregoes potential data. If the issue is potential double-counting, visitors can be asked if they were contacted previously, or surveying could happen simultaneously on the same day in a given region. He also recommended that NVUM protocols be reviewed for these types of relatively simple changes that would make the survey method more applicable to Alaska conditions. He also stated that using undergraduate college students for field survey work has been a successful way to reduce costs while maintaining data quality. Students from the various University of Alaska campuses could be hired for visitor surveys.[18]

Potentially Available Data and Combinations of Data

In this section, we combine insights gained from the discussion above to suggest several potential approaches to data gathering and visitor use estimation.

Intercept Surveys

Intercept surveys have been shown to work for both highway travelers and backcountry users. The Chugach National Forest conducted a major intercept survey in 1995 (U.S. Department of Agriculture Forest Service 1995) by taking advantage of construction projects that brought highway traffic to a halt. It is possible that similar projects may be undertaken in the future. As discussed above, the NPS has been the primary agency doing intercept survey work at gateway airports (e.g., Fairbanks or Bettles). Although we are not aware of the details, it appears that some intercept surveying may have been conducted at one or more gateway entry points (Whittier or Valdez) to the Prince William Sound region of the Chugach National Forest. The

[18] Dr. Loomis recommended contacting the U.S. Army Corps of Engineers regarding their protocols for estimating visitor numbers. However, when contacted, recreation researchers Scott Jackson and Jim Henderson referred us to Alan Watson as the expert on visitor use estimation. They believed that if he had already been contacted, there was no additional information they could provide.

overall conclusion is that intercept survey methods do work in Alaska, and may in fact work better here than elsewhere owing to lack of dispersed access over road networks.

Diary Data

The AVSP demonstrates that expenditure and itinerary diaries can be deployed for large numbers of people. However, AVSP expenditure diaries have not been designed to track detailed geographic movements or activity patterns such as might occur within the Chugach or Tongass National Forests. Thus, we can only speculate that diary-type survey instruments could be distributed to known forest visitors as part of an intercept process.

Business Interviews

Recent research (Dugan et al. 2009) has demonstrated that business interviews can provide low-cost and fairly comprehensive estimates of total revenue from nature-based tourism activities occurring on or near the Tongass National Forest. In theory, all commercial activity that takes place on the Tongass or Chugach National Forest is associated with a special use permit. However, the compilation and analysis of permit data is difficult and some activity may be occurring without the required permits. We suggest that business interviews can be used as a reliable way to track overall recreation and tourism activity over time in communities close to Alaska national forests, and could be benchmarked against periodic survey data on forest users. The business interview approach takes advantage of the fact that in the Tongass region, essentially all recreation activities of certain types (e.g., bear viewing) take place on national forest land. For the Chugach National Forest, business interviews would have to be conducted as part of a multiagency estimation exercise, as visitors may be headed to Kenai Fjords National Park or Chugach State Park, or the Kenai National Wildlife Refuge, all of which essentially abut the national forest.

Multiagency Regional Recreation Surveys

The Alaska Resident Statistics Program is the first effort of which we are aware to estimate joint visitation to public lands irrespective of jurisdiction. The ARSP, however, attempts to cover the entire state and asks people to recall past activity up to 1 year ago. A much more focused and real-time approach might be applied to the Chugach National Forest region. This would require the joint participation of the USDA FS, the NPS, the USFWS, and the Alaska Division of Parks and Outdoor Recreation. A multiagency approach using a common diary or questionnaire would be the best way to take advantage of future road construction projects and the opportunities for intercept surveys that they might present.

Conclusions

Estimating visitor numbers and collecting information on visitor attitudes in Alaska national forests is especially challenging because of the dispersed access to the forests by a relatively small number of visitors. Both the Tongass and Chugach National Forests are millions of acres with miles of saltwater coastline and numerous lakes that allow almost infinite boat and float plane access points. At the same time, few road access points and trailheads exist to concentrate visitors. This dispersed access makes conducting visitor intercept surveys either high cost owing to the large number of intercept sites needed to provide an adequate sample, or less reliable, owing to a smaller number of intercept sites resulting in an inadequate sample. This study identified a number of methods used by land managers in Alaska and other states to address this issue. It also identified other ongoing data collection processes in Alaska such as sport fish angler surveys, traveler surveys, and other systematic efforts that generate data that may be useful for USDA FS efforts to improve their visitor use monitoring processes. The next steps recommended to improve visitor use monitoring are to develop a new visitor monitoring program based on this review of potential methods and then field test the new strategy to see if it can deliver a sustainable program that provides more reliable visitor use estimates at lower costs.

Aknowledgments

We thank the numerous managers and scientists who responded to our request for information regarding visitor sampling programs. We also appreciate the helpful review comments of Susan Alexander, Neal Christensen, and Spencer Phillips. Student intern Joel Ainsworth carefully formatted the bibliography of visitor use estimation literature, helping make this resource available to others.

Metric Equivalents

When you know:	Multiply by:	To get:
Acres	0.405	Hectares
Miles	1.609	Kilometers

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Appendix 1: Alaska Visitor Statistics Program Visitor Survey

9. Where in Alaska did you stay <u>each night</u> while on your trip?
9a. How many nights and what type of lodging?

	Hotel/ motel	Lodge	B&B	Private home	State/Nat'l Campground	Commercial Campground	Wilderness Camping	Cruise Ship	State Ferry	Other	10. DAY VISIT?
01❒ State ferry											
02❒ Cruise ship											
03❒ Anchorage											03❒
04❒ Denali/Healy/ Cantwell											04❒
05❒ Fairbanks											05❒
06❒ Girdwood/Alyeska											06❒
07❒ Glacier Bay/ Gustavus											07❒
08❒ Glennallen											08❒
09❒ Haines											09❒
10❒ Homer											10❒
11❒ Hoonah/ Icy Strait Point											11❒
12❒ Juneau											12❒
13❒ Kenai/Soldotna											13❒
14❒ Ketchikan											14❒
15❒ Kodiak											15❒
16❒ Nome											16❒
17❒ Palmer/Wasilla											17❒
18❒ Petersburg											18❒
19❒ Portage											19❒
20❒ Prince of Wales Is.											20❒
21❒ Prince William Sound											21❒
22❒ Seward											22❒
23❒ Sitka											23❒
24❒ Skagway											24❒
25❒ Talkeetna											25❒
26❒ Tok											26❒
27❒ Valdez											27❒
28❒ Whittier											28❒
29❒ Wrangell											29❒
30❒ Other So.East											30❒
31❒ Other So.Central											31❒
32❒ Other Kenai Pen.											32❒
33❒ Other Interior											33❒
34❒ Other So. West											34❒
35❒ Other Far North											35❒
97❒ Other											97❒

10. Did you visit any communities or destinations <u>without</u> spending the night? 00❒ None **OR**

Figure 7—Questions on locations visited on the Alaska Visitor Statistics Program survey.

Appendix 2: Sources of Information and Documentation

Alaska Visitor Statistics Program

Alaska Visitor Statistics Program, 1983-1984, 1993-1994, 2000-2001, 2006-2007 plus secondary arrival studies for intervening years. These provide Alaska numbers and Prince William Sound in 2006 but are not reliable on a place basis for small communities.
http://www.commerce.state.ak.us/oed/toubus/research.htm

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Chambers of Commerce and Other Nongovernmental Organizations

Cordova Chamber of Commerce and Visitors Bureau
Martin Moe, Executive Director
404 First St., P.O. Box 99
Cordova, AK 99574
(907) 424-7260
Cchamber@ctcak.net
http://www.cordovachamber.com

Whittier Chamber of Commerce
P.O. Box 607
Whittier, AK 99693
(907) 472-2493

Valdez Convention and Visitors Bureau
David Petersen, Executive Director
Box 1603, 200 Fairbanks St.
Valdez, AK 99686
(907) 835-4636
info@valdezalaska.org
http://www.valdezalaska.org

Prince William Sound Economic Development District
Sue Cogswell, Executive Director
2207 Spenard Rd., Suite 207
Anchorage, AK 99503
sue_cogs@yahoo.com
http://www.pwsedd.org

National Wildlife Federation, Alaska Office
Tony Turrini
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Cruise Ship Industry

Cruise Line Agencies of Alaska
21905 64th Avenue West, Suite 301-A
Mountlake Terrace, WA 98043
(425) 329-1020
office@sea.claa.com
http://www.claalaska.com/index.html

Valdez office:
P.O. Box 1170
224 Kobuk Street - Suite 2
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Alaska Department of Fish And Game

Annual Sport Fish License Information

Alaska Department of Fish and Game, Sport Fish Division, Licensing Section
http://www.sf.adfg.state.ak.us/statewide/participationandharvest/index.cfm
Click on "Southcentral Region II," then select the year and "Prince William Sound," hit "submit." The resulting table can be pasted into an Excel spreadsheet taking care to make sure that the locations line up—this may take some moving around because the reported locations change from year to year. These data are for all resident and nonresident anglers based on the location where fishing occurred.

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Alaska Department of Natural Resources

State Parks, Cabin Reservations, and Other Use Statistics

James King
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Chief of Field Operations: Chris Degernes
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National Park Service

Becky Brock
Chief of Concessions (Lake Clark and Katmai National Park and Preserves, Aniakchak National Monument and Preserve, and Alagnak Wild River)
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Ferry, Railroad, and Highway Traffic Information
Alaska Marine Highway System
7559 N. Tongass Highway
Ketchikan, Alaska 99901-9101
(907) 228-7255
Ask_AMHS@dot.state.ak.us

Alaska Marine Highway System Annual reports:
http://www.dot.state.ak.us/amhs/reports.shtml

Whittier Tunnel

Gordon S. Burton
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http://www.dot.state.ak.us/creg/whittiertunnel/trafficdata.htm

The information on this Web site is monthly and annual vehicle counts, which is the number of vehicles recorded in one direction times two—on the assumption that each vehicle goes round trip. This is the standard method for conducting traffic counts. The visitor estimates are from the raw Whittier Tunnel data from Gordon Burton. These are not doubled but estimates of individual visitors passing through the tunnel based on average occupancy rates for different types of vehicles.

Highway/Road Traffic Counts

http://www.dot.state.ak.us/stwdplng/highwaydata/traffic.shtml
At this point, the Department of Transportation (DOT) does not have a permanent traffic recorder (PTR) between Glenallen and Valdez. Alaska DOT provided monthly average daily traffic counts (MADT) numbers for a couple of count locations on the Richardson Highway south of Glenallen. The count station at the Edgerton Highway is not a permanent installation, so information is only available for

the month that it was actually counted. The Valdez PTR site is heavily influenced by local traffic and not a good indicator of visitor traffic along the highway in and out of Valdez. The Ernestine location is probably the number that would provide the best long-term assessment of visitor traffic in and out of Valdez, but that permanent counter was discontinued after 2005. Their plan is to have the Ernestine site functioning again at some point in the next few years. The Northern Region Annual Traffic Volume Report, which is published each year, includes MADT for all PTRs in the Northern Region as well as average annual daily traffic counts (AADT) for many seasonal counts. The most recent version includes the years 2004-2006. This document is usually published in the fall of each year.

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Alaska Railroad Passenger Counts

Bruce Carr, Director of Strategic Planning
CARRB@akrr.com

Airport Passenger Boarding Statistics

http://www.faa.gov/airports_airtraffic/airports/planning_capacity/passenger_allcargo_stats/passenger/
The Federal Aviation Administration posts airport passenger information by calendar years on its Web site. Information is available in downloadable Excel spreadsheets and as Adobe .pdf files. The reference to the pertinent spreadsheets is “Primary and Nonprimary Commercial Service Airports (by Rank Order).” A search will turn up Cordova and Valdez annual statistics.

Researcher Interviews

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Appendix 3: Diagrams of National Park Service, Southwest Alaska Network Park Visitation

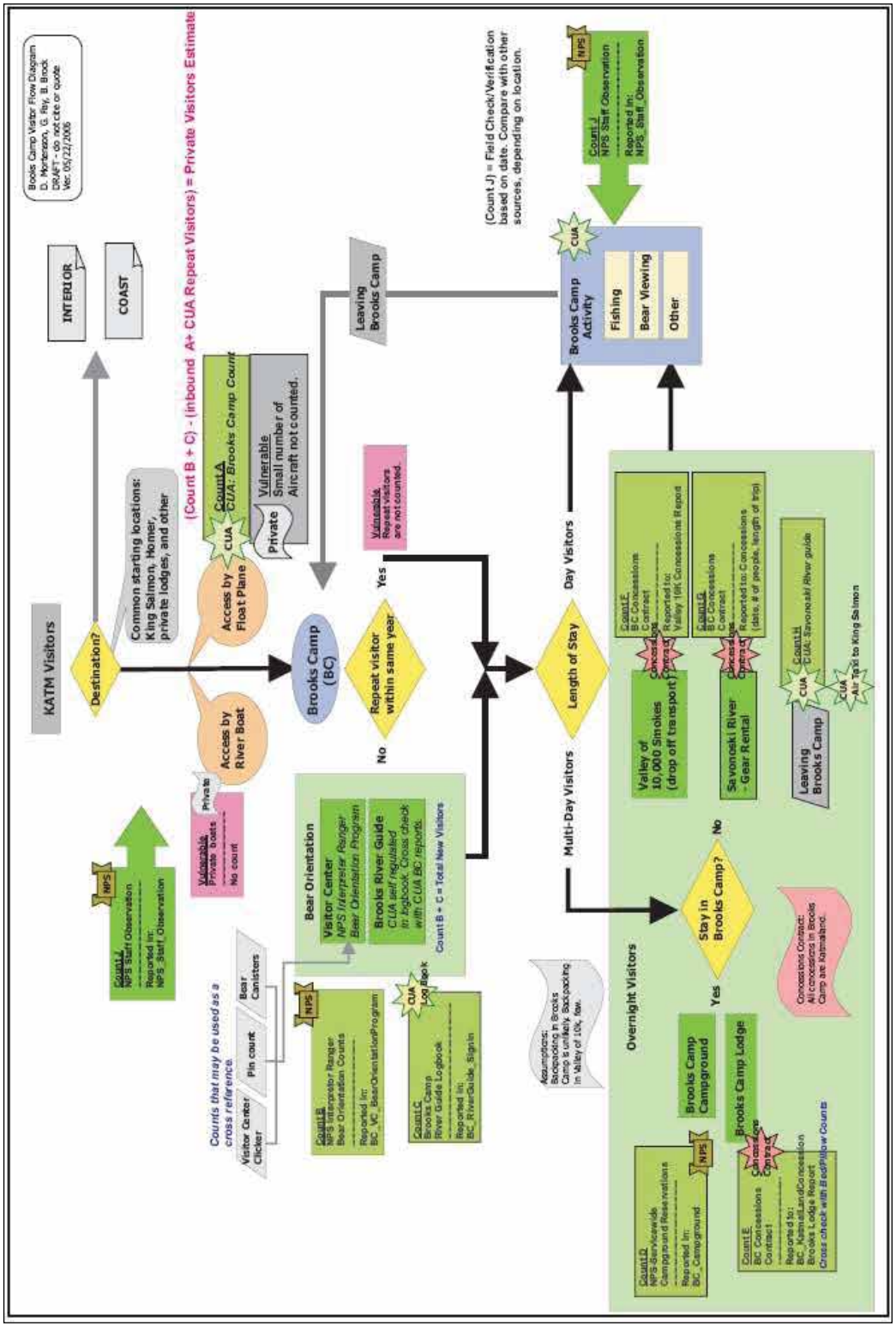

Figure 8—Katmai visitor flow diagram.

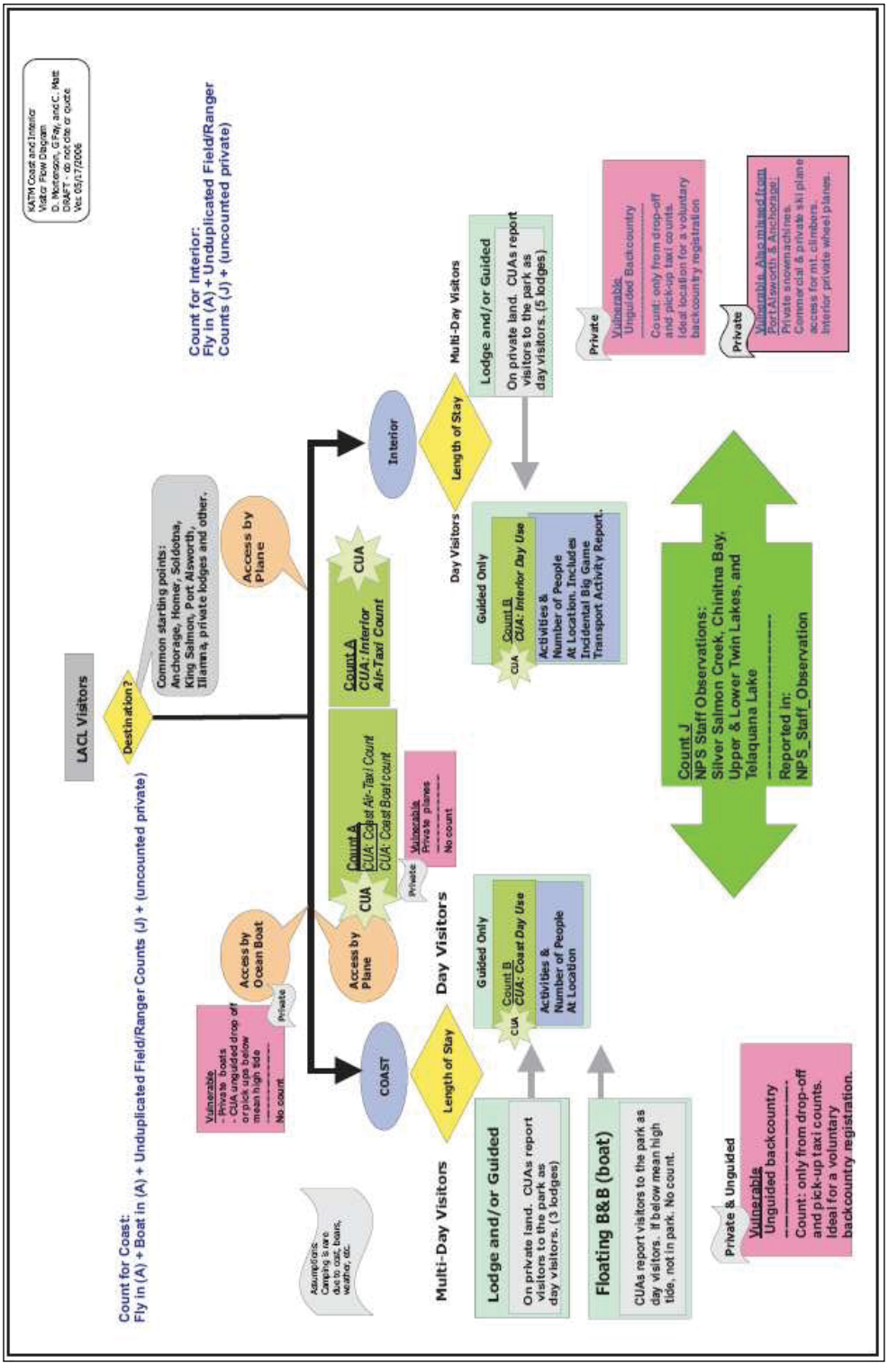

Figure 9—Lake Clark National Park visitor flow diagram.

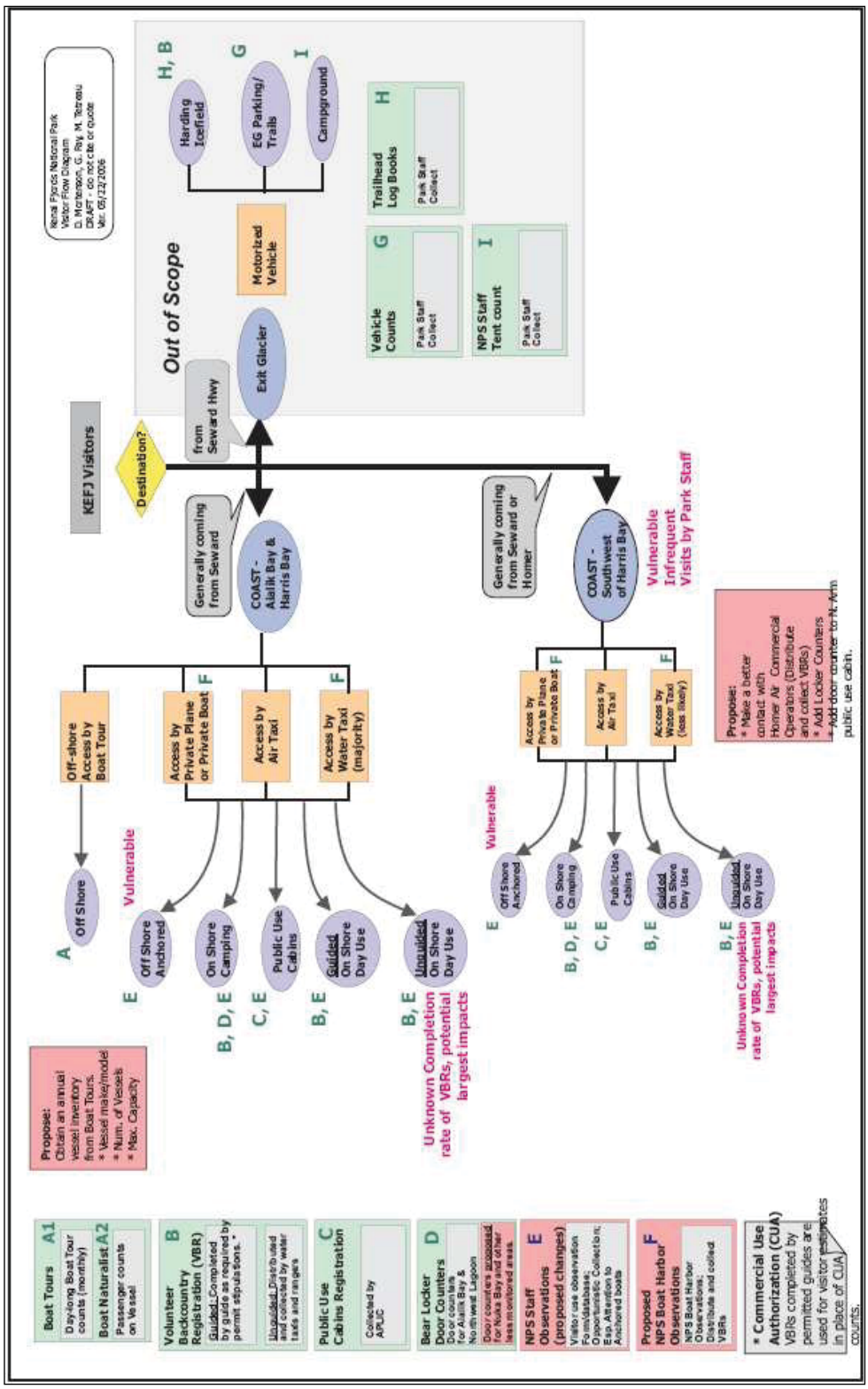

Figure 10—Kenai Fjords National Park visitor flow diagram.

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